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| **University of Kerala** | | |
| Discipline: Electronics |  | Time: 1 Hour 30 Minutes (90 Mins.) |
| Course Code: UK1MDCELE100 |  | Total Marks: 42 |
| Course Title: Electronics for Biology |  |  |
| Type of Course: MDC |  |  |
| Semester: 1 |  |  |
| Academic Level: 100-199 |  |  |
| Total Credit: 3, Theory: 3 Credit  (Applicable for 4 Credit Course with 1 Credit Practical Also) |  |  |

Part A. 6 Marks. Time: 6 Minutes

Objective Type. 1 Mark Each. Answer All Questions

(Cognitive Level: Remember/Understand)

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| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course Outcome (CO)** |
| 1. | Define a bio-inspired invention. | Remember | 1 |
| 2. | Identify the main components of the central nervous system. | Remember | 2 |
| 3. | Interpret the significance of the cell membrane in a cell. | Understand | 1 |
| 4. | Describe the process by which the central nervous system responds to stimuli. | Understand | 2 |
| 5. | Explain how the human eye focuses light. | Understand | 3 |
| 6. | Summarize the role of an artificial pancreas in diabetes management. | Understand | 4 |

Part B. 8 Marks. Time: 24 Minutes

Short Answer. 2 Marks Each. Answer All Questions

(Cognitive Level: Understand/Apply)

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| **Qn.**  **No.** | **Question** | **Cognitive Level** | **Course Outcome (CO)** |
| 7. | Explain how bio-inspired inventions can benefit engineering practices. | Understand | 1 |
| 8. | Describe a key feature of the central nervous system and its function. | Understand | 2 |
| 9. | Can you use the principles of the electronic nose to design a simple experiment to detect specific odors? | Apply | 3 |
| 10. | How would you implement an artificial pancreas to manage blood glucose levels in diabetic patients? | Apply | 4 |

Part C. 28 Marks. Time: 60 Minutes

Long Answer. 7 marks each. Answer all 4 Questions, choosing among options within each question.

(Cognitive Level: Apply/Analyze/Evaluate/Create)

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| **Qn.**  **No.** | **Question** | **Cognitive**  **Level** | **Course Outcome (CO)** |
| 11.a)  b) | Demonstrate the process of interpreting ECG results to diagnose cardiac disorders.  **OR**  Explain how the sodium-potassium pump maintains the resting membrane potential. | Apply | 1 |
| 12.a)  b) | Assess the impact of machine learning techniques on the development of neural networks.  **OR**  Evaluate the significance of the central nervous system in maintaining homeostasis. | Analyze | 2 |
| 13.a)  b) | Judge the impact of advancements in digital camera technology on professional photography.  **OR**  Critically evaluate the challenges in developing sensors for biomedical applications. | Evaluate | 3 |
| 14.a)  b) | Assess the impact of regulatory policies on the development and approval of artificial organs.  **OR**  Evaluate the effectiveness of current artificial kidney technologies in comparison to natural kidney functions. | Evaluate | 4 |

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| **Cognitive Level** | **Marks** | **Percentage** |
| Remember | 2 | 4.8 |
| Understand | 8 | 19.0 |
| Apply | 11 | 26.2 |
| Analyse | 7 | 16.7 |
| Evaluate | 14 | 33.3 |
| **Total** | **42** | **100** |

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| **Course Outcomes** | **Marks** | **Percentage** |
| 1 | 11 | 26.2 |
| 2 | 11 | 26.2 |
| 3 | 10 | 23.8 |
| 4 | 10 | 23.8 |
| **Total** | **42** | **100** |